

IN THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in this application.

1. (Currently Amended) ~~An apparatus~~ A multipole ion guide for a mass spectrometer[[.]]

~~wherein said apparatus comprises comprising:~~

at least one pair of conducting rods aligned in parallel, each pair being equally spaced
from one another;

at least one capping electrode comprising at least one opening and bounding said
conducting rods;

means for applying RF/DC potentials ~~voltages~~ to said conducting rods; and

means for applying a DC potential ~~voltages~~ to said capping electrodes[.] [[;]]

~~wherein said conducting rods are aligned in parallel;~~

~~wherein said at least one capping electrode bounds said conducting rods, and~~

~~wherein said at least one capping electrode comprises at least one opening.~~

2. (Currently Amended) ~~An apparatus~~ A multipole ion guide according to claim 1, wherein
said at least one capping electrode comprises a plurality of openings.

3. (Currently Amended) ~~An apparatus~~ A multipole ion guide according to claim 2, wherein
at least one of said openings accepts sample ions.

4. (Currently Amended) ~~An apparatus~~ A multipole ion guide according to claim 2, wherein at least one of said openings provides access through said ion guide for a laser beam to ionize a sample material.
5. (Currently Amended) ~~An apparatus~~ A multipole ion guide according to claim 1, wherein said ion guide focuses sample ions.
6. (Currently Amended) ~~An apparatus~~ A multipole ion guide according to claim 1, wherein said apparatus traps sample ions therein for ion selection.
7. (Currently Amended) ~~An apparatus~~ A multipole ion guide according to claim 1, wherein said apparatus traps sample ions therein for ion fragmentation.
8. (Currently Amended) ~~An apparatus~~ A multipole ion guide according to claim 1, wherein each said conducting rod is positioned equidistant from a vertical axis.
9. (Currently Amended) ~~An apparatus~~ A multipole ion guide according to claim 1, wherein said apparatus transfers sample ions from an ionization region to a mass analysis region.
10. (Currently Amended) ~~An apparatus~~ A multipole ion guide according to claim 9, wherein said mass analysis region comprises a mass analyzer.

11. (Currently Amended) ~~An apparatus~~ A multipole ion guide according to claim 10, wherein said mass analyzer selected from the group consisting of a time-of-flight mass analyzer, a quadrupole mass analyzer a quadrupole ion trap mass analyzer, a Fourier transform ion cyclotron resonance mass analyzer and an ion mobility mass analyzer.

12. - 14 (Cancelled)

15. (Currently Amended) ~~An apparatus~~ A multipole ion guide according to claim 9, wherein said ionization region comprises an ion production means.

16. (Currently Amended) ~~An apparatus~~ A multipole ion guide according to claim 15, wherein said ion production means is selected from the group consisting of atmospheric pressure chemical ionization, electrospray ionization, matrix-assisted laser desorption/ionization, secondary ionization and fast atom bombardment.

17. -20. (Cancelled)

21. (Currently Amended) ~~An apparatus~~ A multipole ion guide for analyzing chemical species, wherein said ~~apparatus~~ multipole ion guide comprises:

~~at least one ion production region; an ion guide, said ion guide having~~
a plurality of conducting ~~electrodes~~ rods and at least one capping electrode comprising at least one opening and bounding said conducting rods; and

means for applying voltages to said ion guide;

~~a plurality of vacuum stages; and an analysis region;~~

wherein said ion guide accepts sample ions from ~~any said~~ at least one ion production region, and wherein said ion guide transfers said sample ions to said an analysis region through a plurality of vacuum stages.

22. (Currently Amended) ~~An apparatus~~ A multipole ion guide according to claim 21, wherein at least one of said capping electrodes comprises at least one opening.

23. (Currently Amended) ~~An apparatus~~ A multipole ion guide according to claim 22, wherein at least one of said openings accepts said sample ions from at least one said ionization region.

24. (Currently Amended) ~~An apparatus~~ A multipole ion guide according to claim 22, wherein at least one of said openings provides access through said ion guide for a laser beam to ionize a sample material.

25. (Currently Amended) ~~An apparatus~~ A multipole ion guide according to claim 21,
wherein said ion guide focuses sample ions.

26. (Currently Amended) ~~An apparatus~~ A multipole ion guide according to claim 21,
wherein said ion guide traps sample ions therein for ion selection.

27. (Currently Amended) ~~An apparatus~~ A multipole ion guide according to claim 21,
wherein said ion guide traps sample ions therein for ion fragmentation.

28. (Currently Amended) ~~An apparatus~~ A multipole ion guide according to claim 21,
wherein each said conducting rod is positioned equidistant from a vertical axis.

29. (Currently Amended) ~~An apparatus~~ A multipole ion guide according to claim 21,
wherein said analysis region comprises a mass analyzer.

30. (Currently Amended) ~~An apparatus~~ A multipole ion guide according to claim 29,
wherein said mass analyzer is selected from the group consisting of an ion mobility analyzer, a
time-of-flight mass analyzer, a quadrupole mass analyzer, a quadrupole ion trap mass analyzer,
and a Fourier transform ion cyclotron resonance mass analyzer.

31. – 33. (Cancelled)

34. (Currently Amended) ~~An apparatus~~ A multipole ion guide according to claim 21, wherein said ion production region comprises an ion production means.

35. (Currently Amended) ~~An apparatus~~ A multipole ion guide according to claim 34, wherein said ion production means is selected from the group consisting of electrospray ionization, atmospheric pressure chemical ionization, matrix assisted laser desorption/ionization, glow discharge, secondary ionization and fast atom bombardment.

36 - 40. (Cancelled)

41. (Currently Amended) A method for analyzing chemical species in a mass spectrometer comprising an ion production means, at least one multipole ion guide, a vacuum system, and a mass analyzer, said method comprising the steps of:

- (a) producing ions in an ion production region;
- (b) introducing said ions into an ion guide, said ion guide comprising a plurality of conducting rods and at least one capping electrode comprising at least one opening and bounding said conducting rods;
- (c) applying a first potential to said conducting rods such that said ions move to a central axis of said ion guide;
- (d) transferring said ions from said ion guide into a mass analysis region; and
- (e) conducting mass analysis of said ions.

42. **(Original)** A method according to claim 41, wherein said ions are produced from a plurality of said ion production means.

43. **(Original)** A method according to claim 41, wherein gas phase chemical reactions occur within the ion guide.

44. **(Original)** A method according to claim 41, wherein ion selection occurs within said ion guide.

45. **(Original)** A method according to claim 41, wherein ion fragmentation occurs within said ion guide.

46. **(Original)** A method according to claim 41, wherein said ions are transferred from said ion guide into a second ion guide before entering said mass analysis region.

47. **(Currently Amended)** A method according to claim 41, wherein said method further comprises the step of: [(d)] (c) applying a second potential to said capping electrode to create an electric field to trap said ions within said ion guide.

48. **(Original)** A method according to claim 41, wherein said capping electrode is an electrode rod.

49. (Original) A method according to claim 41, wherein said capping electrode is an electrode plate.

50. (Currently Amended) ~~An apparatus~~ A multipole ion guide according to claim 21, wherein said capping electrode is an electrode rod.

51. (Currently Amended) ~~An apparatus~~ A multipole ion guide according to claim 21, wherein said capping electrode is an electrode plate.

52. (Currently Amended) ~~An apparatus~~ A multipole ion guide according to claim 1, wherein said capping electrode is an electrode rod.

53. (Currently Amended) ~~An apparatus~~ A multipole ion guide according to claim 1, wherein said capping electrode is an electrode plate.